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## **TOWARDS A MANAGERIAL ATTITUDE CHANGE IN FOREST MANAGEMENT COMPANIES: INNOVATIVE AND TECHNOLOGICAL APPROACH**

JEL classification: O31, O32

***Abstract***

*The purpose of this paper is to present and analyse current level of management, innovation and technological practices of FBiH's forest management companies (FMC) and suggest new innovative technologies and management concepts. Qualitative methods are used to present and analyse data. Research was performed in two stages: first step was literature, government reports and FMCs sustainability reports review. The second step was an analysis of data from reviewing surveys, reports and data driven from direct communication with the company's management. Five leading FMCs in wood industry of BiH are selected. The paper is the first attempt to examine the development of management, innovation and technological practices in order to fully develop their potential in the future.*

***Keywords:*** forest management companies, management design attitude, resource tracking system

## 1. INTRODUCTION

Forests cover almost one third of the world's surface. Federation of Bosnia and Herzegovina (FBiH) has a vast quantity of forest: in Europe in average there is 0,34ha of forest per capita while in FBiH this ratio is 0,48ha per capita (Federalno ministarstvo poljoprivrede, vodoprivrede i šumarstva, 2011).

Forests are (and have been) managed almost exclusively for timber production, and only 6 percent of all BiH forests are not classified as production forests (EU PHARE, 2000). Other important functions of forests such as watershed management, biodiversity conservation, non-timber forest products, and environmental protection do not figure significantly in forest management strategies (Federalno ministarstvo poljoprivrede, vodoprivrede i šumarstva, 2011). Production of wood and wooden furniture has a large potential in economic development (IMF, 2004). However, in order to realize this potential, FBiH firms should incorporate modern management design methods.

The purpose of this paper is to provide an overlook of Forest Management Companies (FMC) in FBiH, their business strategies and willingness to implement the innovative design thinking and modern tracking information models in their management system. An exploratory comparative case study analysis of five leading FMCs is performed to demonstrate the above aim: Una-Sana Canton FMC, Sarajevo Canton FMC, Zenica-Doboj Canton FMC, Middle Bosnia Canton FMC and Canton 10 FMC. This research intends to provide answers to the following questions:

*RQ1: Do management of FMCs in FBiH recognize and apply innovative management methods?*

*RQ2: What is the nature of innovative management methods and to what extent do they affect the sustainable forest management?*

After the introduction section, the literature review is presented with the focus to the main characteristics of FMCs by introduction of management design attitudes, information tracking system and their relationship in the context of sustainable business management. The third section introduces our research design and methodology. The fourth section reports on the findings and results of five case studies. The final section provides a discussion of limitations, lessons learnt, and suggestions for future research and conclusions.

## 2. LITERATURE REVIEW

Sustainable forest management means the environmentally appropriate, socially beneficial, and economically viable management of forests for present and future generations – a definition adopted by the Food and Agriculture Organization (FAO) of the United Nations.

Efficiency is necessary but not sufficient for sustainable business success says Michael Porter; a unique strategic positioning is indispensable for sustainable success (Porter, 1999). Moreover, a competitive advantage can be reached by improving coordination among functions within the company (Porter, 1986; Borja de Mozota, 2003).

Herbert Simon, Nobel laureate in economics, wrote *The Sciences of the Artificial*, which is one of the finest examples we have of a well-developed theory of the design attitude for managers. Simon called for a new curriculum for management education based on design. He is claiming that management is a profession whose training should follow that of engineering or architecture as an applied science and not that of the natural sciences. The manager's professional responsibility is not to discover the laws of the universe, but to act responsibly in the world to transform existing situations into more preferred ones. Simon held that, like the engineer or the architect, the manager is a form-giver who shapes organizations and economic processes. As he states: "Engineering, medicine, business, architecture, and painting are concerned not with the necessary but with the contingent—not how things are but how they might be—in short, with design." (Simon, 1996)

Management-thinking is rather linear and strives for efficiency; design-thinking is rather holistic, chaotic and emotional and strives for uniqueness and quality. Striving for efficiency is not sufficient to create sustainable success; Furthermore, innovation and design are needed to create a unique profile. The integration of design and business strategy should be an emerging process, because successful new ideas and solutions are the result of network and holistic thinking (Boland, 2004).

The importance of holistic design approaches was brought to a point by David Arbuckle: "I believe that managing design, design strategy, and innovation as a totality in the overall business is as important, if not more important, than the individual creative process." (Gornick, 2002).

In fact, any organization on a mission to create economic and human value – be it a federal government or well established commercial enterprise – can harness the power of design thinking to drive true innovations (Fraser, 2006).

The design attitude adds another way of thinking in management. Rather than deciding between alternatives, it is about shaping and creating new alternatives. 'The design attitude appreciates that the cost of not conceiving of a better course of action than those that are already being considered is often much higher than making the "wrong" choice among them.' (Boland, 2004). Design thinking can contribute new methods and ways to sustainable managing in a complex business world of fierce and global competition in which competitive advantages are hard to establish and cost leadership is not easy to be sustained. Table 1 presents differences between decision and design attitude characteristics.

Table 1

## Decision versus Design attitude

|                       | Decision attitude                     | Design attitude                       |
|-----------------------|---------------------------------------|---------------------------------------|
| Method                | Deciding between alternatives         | Creating and shaping new alternatives |
| Orientation           | Short-term                            | Long-term                             |
| Risk disposition      | Risk- and uncertainty avoidance       | Higher risk and uncertainty           |
| Assumptions made upon | Analytical thinking of past-term data | Intuitive; feelings; originality      |
| Mode of thinking      | Reliability                           | Validity                              |
| Reasoning             | Deduction and induction               | Abduction                             |

*Source: Boland, 2004, p.*

According to FIRMA Saw log Market Report, last national inventory data were collected between 1964 and 1968. Forest and forest land cover more than 50 percent of the land area in BiH. Forests are mainly publicly owned with no Country level department that enforces regulations regarding forest matters. Production in the forest area is heavily reliant on human labour and no high equipment operating investments were made in the forestry sector after the 1992-1995 war. Opportunities that wood-processing industry in Bosnia and Herzegovina should look for are exporting the timber and wood products globally in order to eliminate the mismatch between internal demand for wood products and supply for the future productions in sawmills and wood factories. In order to accomplish that first step, the entirety of the supply chain in Bosnia and Herzegovina needs to be controlled. This is a process that will take time, investments, reorganizing business processes and knowledge transfer among companies and countries.

Some of the EU promotion programmes are concerned with organizational learning processes (UNECE/FAO, 2011). Regional Innovation Systems (RIS) framework is an EU attempt to intensify public-private knowledge transfer and increase innovation among public and private organizations (Gerstlberger, 2004). This is supposed to drive new impulses for socioeconomic regional development (Braczyk et al., 1998). Major components of RIS (Fritsch, 1999) have been defined as: concrete public components, concrete private components, concrete public and private components and individual policies.

As Porter's model suggested that design attitude creates competitive advantage through knowledge and innovation management. In order to apply design thinking in organizations in terms of internal (departments) and external (client resources, country regulations) coordination and knowledge sharing it is essential for BiH forest companies to adopt information systems that will support RIS areas.

### 3. METHODOLOGY

Forest management companies (FMCs) from FBiH participated in the study. Among the total number of 11 FMCs, five of them (45,5%) agreed to participate in the study and to give relevant information on their size, management practices, innovation practices and level of technology adoption in the firm. Companies were named A, B, C, D and E. Research was based on the presumption that competitive forces in any given industry and innovation are interrelated (Porter, 1986).

Managers responsible for innovative practices and technology adoption in the company were included in the survey (e.g. Chief Executive Officer, Board of Managers member, Chief Information Officer and Chief Technology Officer), as well as employees working with innovation and technology systems were included in the survey. In-depth interviews were conducted with employees from each FMCs in order to assess levels of innovative practices and the level of technology adoption in the firm. In some firms inconsistencies were found among two interviewees (e.g. CIO and CEO), and additional explanations were sought in such cases. Finally, interviews were analysed together with the goal to find areas where additional information is needed in order to assess the validity of the study.

Since literature is scarce in research with the topic of innovation and technology adoption in FMCs, our paper implements descriptive case studies in order to get information sufficient for answering research questions. Analysis is structured in three areas: (1) Management practices of FBiH FMCs, (2) Innovation practices of FBiH FMCs, and (3) Technology practices of FBiH FMCs.

Table 2 presents the main characteristics of FBiH companies participating in the survey. General manager of the company or one of the members of Board of Management participated in the survey. In order to keep the anonymous identity of FMCs, we present only basic information on the companies: number of employees, average age of employees and FSC certification that is conducted by Forest Stewardship Council, US based non for profit organization. Number of employees range from 400 to above 1000, and average age of employees ranges from 41 to 46 years.

Table 2

Main characteristics of FBiH forest companies

| Characteristic           | FBiH Forrest Management Company |      |      |      |      |
|--------------------------|---------------------------------|------|------|------|------|
|                          | A                               | B    | C    | D    | E    |
| Number of employees      | >1000                           | >600 | >800 | >400 | >500 |
| Average age of employees | 41                              | 46   | 45   | 42   | 46   |
| FSC certification        | ✓                               | ✓    | ✓    | ✓    | ✓    |

*Source: Author survey*

## 4. RESULTS

Result section consists of three parts: (1) Management practices of FBiH FMCs, (2) Innovation practices of FBiH FMCs, and (3) Technology practices of FBiH FMCs. For each company, relevant information is presented.

### 4.1. Management practices of FBiH FMCs

Table 3 presents planning process of FBiH FMCs and it investigates three levels of planing: long-term strategic plan, marketing plan and research and development innovation plan. The two companies do not implement any form of planning. Company B implements long-term strategic plan and research and development innovation plan. Two companies implement only one plan. Company D implements the only marketing plan, and firm E implements only long-term strategic plan. The results of the survey indicate very low levels of planning in FBiH FMCs indicating that companies probably rely on their monopolistic position since are publicly owned.

Table 3

Planning practice of FBiH FMCs

| Characteristic                           | FBiH Forrest Management Company |   |   |   |   |
|--|---------------------------------|---|---|---|---|
|  | A                               | B | C | D | E |
| Long-term strategic plan                 | Ø                               | ✓ | Ø | Ø | ✓ |
| Marketing plan                           | Ø                               | Ø | Ø | ✓ | Ø |
| Research and development innovation plan | Ø                               | ✓ | Ø | Ø | Ø |

*Source: Author survey*

Table 4 presents customer relationship practices of FBiH FMCs, and it investigates to what extent interviewees agree (from 1-Completely disagree to 5-Completely agree) with the statement that their company is customer oriented. In addition, interviewees reported on tools used in their companies for measuring level of customer satisfaction. Interviewees from two companies (A and B) completely agree that their companies are customer oriented, and they use numbers and frequency of complaints, employee survey and customer satisfaction survey as a tool for measuring level of customer satisfaction. Three companies (C, D and E) do not measure levels of customer satisfaction, and interviewees from the two companies are undecided (company D) or agree (company E) with the statement that their company is customer oriented. We can resume that FBiH FMCs are only partially customer oriented, and this result confirms the previous finding that companies probably rely on their monopolistic position since are publicly owned.

Table 4

## Customer relationship practices in FBiH FMCs

| Characteristic                                     | FBiH Forrest Management Company |                      |                         |               |           |
|--|---------------------------------|----------------------|-------------------------|---------------|-----------|
|  | A                               | B                    | C                       | D             | E         |
| Our company is customer oriented                   | Completely agree (5)            | Completely agree (5) | Completely disagree (1) | Undecided (3) | Agree (4) |
| Tool for measuring level of customer satisfactions |                                 |                      |                         |               |           |
| Number and frequency of complaints                 | ✓                               | ✓                    | Ø                       | Ø             | ✓         |
| Customer satisfaction survey                       | Ø                               | ✓                    | Ø                       | Ø             | ✓         |
| Employee survey                                    | ✓                               | ✓                    | Ø                       | Ø             | Ø         |
| We do not measure level of customer satisfaction   | Ø                               | Ø                    | ✓                       | ✓             | Ø         |

#### 4.2. Innovation practices of FBiH FMCs

Table 5 presents management attitudes toward innovations in FBiH FMCs. Interviewees were asked to present their opinion towards innovation in their companies. Likert scale from 1 to 5 (1-Completely disagree, 5-Completely agree) was used to measure to what extent interviewees agree on following statements: (1) Innovations are important for our company; (2) Innovation is a technological process; (3) Innovation can be a managerial concept as well; (4) Innovation is an economic competency, and (5) Innovation in the company has an impact on all value chain stakeholders.

Manager from company A scored the highest (average 4.80) according to the level of agreement with the above statements, indicating that he or she has a broad and open perspective on innovations. Managers from companies C and E are following, with average grades of 3,80 and 3,60, respectively. Managers from companies B and D scored really low with average grades of 2,00 and 2.80, respectively. Attitude of managers from both companies B and D is that they completely disagree with the statement that innovations are important for their company. Manager from company B also completely disagree with the statement that innovation in a company has an impact on all value chain stakeholders.

Table 5

Management attitudes toward innovations in FBiH FMCs  
(1-Completely disagree, 5-Completely agree)

| Characteristic   | FBiH Forrest Management Company |                         |                         |                         |                      |
|--|---------------------------------|-------------------------|-------------------------|-------------------------|----------------------|
|  | A                               | B                       | C                       | D                       | E                    |
| Innovations are important for our company                        | Agree (4)                       | Completely disagree (1) | Completely agree (5)    | Completely disagree (1) | Agree (4)            |
| Innovation is a technological process                            | Completely agree (5)            | Undecided (3)           | Completely disagree (1) | Undecided (3)           | Undecided (3)        |
| Innovation can be a managerial concept as well                   | Completely agree (5)            | Undecided (3)           | Agree (4)               | Undecided (3)           | Undecided (3)        |
| Innovation is an economic competency                             | Completely agree (5)            | Disagree (2)            | Agree (4)               | Undecided (3)           | Undecided (3)        |
| Innovation in company has impact on all value chain stakeholders | Completely agree (5)            | Completely disagree (1) | Completely agree (5)    | Agree (4)               | Completely agree (5) |
| Average  | 4,80                            | 2,00                    | 3,80                    | 2,80                    | 3,60                 |
| St.Dev.  | 0,45                            | 1,00                    | 1,64                    | 1,10                    | 0,89                 |

Source: Author survey

Table 6 presents the innovation's impact to company turnover in FBiH FMCs. Three companies reported a moderate increase in turnover compared to 2010 and 2011. One company reported a very large increase of more than 90% for both years. However, it is surprising that only two managers reported that increase in turnover is influenced by the innovations.

Table 6

Innovations' impact to company turnover in FBiH FMCs

| Characteristic   |                   | FBiH Forrest Management Company |     |     |     |                |
|--|-------------------|---------------------------------|-----|-----|-----|----------------|
|  |                   | A                               | B   | C   | D   | E              |
| Change in company turnover                             | Compared to 2010. | 8,37%                           | 16% | 0%  | 98% | No information |
|  | Compared to 2011. | 5,07%                           | 3%  | 10% | 92% | No information |
| Did innovations influence changes in company turnover? |                   | ✓                               | Ø   | Ø   | Ø   | ✓              |

Source: Author survey



#### 4.3. Technology practices of FBiH FMCs

Table 7 presents ICT practices of FBiH FMCs. Managers were asked to report on the usage of ICT applications: (1) Company Web site, (2) IT system for tracking internal / external resources, and (3) IT system for tracking illegal forest harvesting. Managers were also asked to report whether a manual system for tracking resources is still used in their companies, as well as the time needed for reporting on illegal forest harvesting. All of the companies have the company web site, and all of them use IT systems for tracking internal / external resources. Companies A and B use horizontal software application designed specifically for the forest industry. However, companies D and E use database applications, while company D uses only basic MS Office applications like MS Excel. That company is also using a system for tracking resources manually, as well as company A. Only two companies use IT system for tracking illegal forest harvesting. Companies indicated time needed for reporting in case of illegal forest harvesting. There is evidence that this time is related to existence of IT system for the same purpose. The shortest time to report illegal forest harvesting (less than 30 minutes) is declared by companies B and D. At the same time, both companies use IT system for tracking illegal forest harvesting.

Table 7

ICT practice of FBiH FMCs

| Characteristic   | FBiH Forrest Management Company    |                                    |                          |                          |                          |
|--|------------------------------------|------------------------------------|--------------------------|--------------------------|--------------------------|
|  | A                                  | B                                  | C                        | D                        | E                        |
| Company Web site   | ✓                                  | ✓                                  | ✓                        | ✓                        | ✓                        |
| IT system for tracking internal / external resources           | ✓<br>(Horizontal software applic.) | ✓<br>(Horizontal software applic.) | ✓<br>(Data base applic.) | ✓<br>(MS Office applic.) | ✓<br>(Data base applic.) |
| Tracking resources manually                                    | ✓                                  | Ø                                  | Ø                        | ✓                        | Ø                        |
| IT system for tracking illegal forest harvesting               | Ø                                  | ✓                                  | Ø                        | ✓                        | Ø                        |
| Time needed for reporting in case of illegal forest harvesting | More than 2 hours                  | 0-30 minutes                       | 1-2 hours                | 0-30 minutes             | More than 2 hours        |

Source: Author survey

## 5. CONCLUSIONS

The entire (horizontal and vertical) wood sector value chain structure is much dependent on effective governance of FMCs. In our research we investigated main forces that drive the adoption of management design attitude and present forces of decision management attitude. Based on research driven secondary data analysis as well as on our own practical experience, the paper shows a need for FMCs to establish a sustainable management system that would give more emphasis towards both innovation and technology adoption. Our research revealed that managers of FMCs in FBiH recognize and apply innovative management methods only to the moderate extent (*RQ1*). In addition, nature of innovative management methods is only basic if any. Therefore, they could affect the sustainable forest management to the lowest level (*RQ2*).

In order to reach satisfying standards, and overcome existing problems, a systematic approach is needed. The use of business tracking models in forestry, resource tracking information system and adoption of management design attitude in contrast to decision attitude reveals to be crucial for the future success of the FMC.

The limitations of our research stem from the fact that five FMCs participated in our survey, although there are a total of 11 FMCs in FBiH. Also, we used a rather simple questionnaire in order to get trust from FMCs participating in the survey, since this survey is preliminary in terms of both sample characteristics and the depth of the study. Therefore, future research is planned in order to incorporate more FMCs in the sample, and to broaden the research instrument. That research would stem toward proposal and development of adoption model of management design attitude using technology and innovative management specifically tailored for FMCs in transition countries.

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